

Step-by-step towards a better understanding of health behaviour

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Valorisation Addendum

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The aim of the valorisation addendum is to describe the scientific and societal impact of this thesis. This section will discuss the relevance of the findings for the scientific and societal valorisation.

Relevance

Approximately 70% of deaths world-wide is caused by non-communicable diseases (NCDs), which are often caused by four behavioural risks factors: Unhealthy diets, physical inactivity, tobacco use, and alcohol consumption (WHO, 2018). Prevention of NCDs therefore entails the change of these unhealthy behaviours (Ezzati & Riboli, 2013; Nugent et al., 2018; WHO, 2009). To foster behaviour change, it is essential to understand the determinants of healthy and unhealthy behaviour. A variety of models that help to explain behaviour (change) have been introduced and tested over the last decades and have formed the basis for health and lifestyle interventions. Despite the common use of these models, they all show some weaknesses regarding their predictability or practicability. However, theory testing and development is essential for evidence-based intervention development to ensure the minimisation of type III errors. Type III errors regard the negative or no effect of poorly designed or implemented interventions on their effectiveness (Green, 2000). To optimize effectiveness of health promotion interventions, it is necessary to systematically test the assumptions of theories that are used and to improve them where it is necessary. This cannot just lead to a better understanding of health behaviour but help health professionals to construct and implement health promotion interventions to foster effective and long-lasting change.

In this thesis, the predictive value and the underlying processes of one of these models, the I-Change Model (De Vries, 2017), have been investigated to optimize the model and our understanding of different health behaviours. The research has focused on three aspects of the model: (1) the delivery of health

messages, (2) the influence of pre-motivational factors including the introduction of a new concept (i.e. cognizance) and (3) the role of plan enactment within the post-motivational phase of behaviour change.

Relevance future research and intervention development

For each part of the thesis we will shortly look into the relevance for future research and intervention development.

The first part of the thesis focused on the delivery of health messages. The results of Chapter 2 show that against our hypothesis mHealth (i.e. delivery over SMS used on a mobile phone) is not always favourable to eHealth (i.e. delivery over email used on a computer). Although the effectiveness of both interventions did not differ significantly, the use, usability, and appreciation of the eHealth intervention exceeded the mHealth version. While there is evidence that health promotion can benefit from mhealth, the results indicate that the use of mobile phone (applications) needs to be considered and developed carefully (Müller, Alley, Schoeppe, & Vandelanotte, 2016; O'Neill & Brady, 2012; O'Reilly & Spruijt-Metz, 2013). As mHealth is prone to high drop-out it may thus not be always suitable or the best and only strategy compared to other intervention delivery systems for health behavior interventions. Therefore, researchers should focus on the investigation of barriers (e.g. rapid distraction by other applications) and facilitators (e.g. the on-the-go feature or the possibility to give instant feedback) to mobile phone use as a delivery channel, to get a better understanding of the mechanisms that underlie the use of mobile phones within the field of health promotion. Hereby research needs to identify which behaviour change techniques (Michie et. al, 2013) are most appropriate to integrate in mhealth interventions and how techniques can be adapted to fit the characteristics of mobile phone use. Furthermore, research should focus on the best ways to integrate mHealth interventions for different behaviours into a person's daily life. Currently, examples such as monitoring of and instant feedback on physical activity and dietary intake are being used in

intervention. However, other possibilities such as reminders and boosters are less frequently used until now. Intervention developers should make use of theory-based change techniques that can be used within mHealth and should focus especially on the quality and effectiveness of existing intervention programs to detect pitfalls and learn from earlier mistakes. Additionally, health professionals need to collaborate with experts in other fields (e.g. web-design or (social) marketing) to develop interventions that are engaging, enjoyable, attractive, safe and easy to use so that prolonged use can be ensured (Crutzen, Cry & de Vries, 2011). Research shows that users of mobile phone applications especially are concerned with privacy and safety issues as well as the usability of applications (Woldaregay, 2018; Kumar, 2013).

The second part of the thesis focused on pre-motivational factors and their influence within the I-Change model on motivational processes and behaviour. The results of Chapter 3 confirmed earlier findings that factors such as knowledge, risk perception and cues precede motivation within the process of behaviour change. Furthermore, a new concept (i.e. cognizance) was introduced and first efforts were made to conceptualize the concept. The results of chapter 4 indicate that there are different levels of cognizance (e.g. positive cognizant, negative cognizant and non-cognizant) and that the strength of motivation might differ between these levels. Studies with a larger study population would be needed to distinguish these different levels of cognizance and their influence on motivation. While the results of the studies showed that cognizance plays a central role within the formation of motivation, more research is needed to fully conceptualize cognizance and to test its relationship with other pre-motivational factors. Researchers therefore should focus on the conceptualisation of cognizance based on the eight proposed groups and should test the suitability of this differentiation for different health behaviours. Within this thesis cognizance was only considered for physical activity and sedentary behaviour, however, one could argue that being aware of what one is doing and whether this is in line with guidelines might be of less importance for other

behaviours (e.g. smoking cessation). Understanding the role of cognizance within the pre-motivational phase as well as with regard to motivation formation can help intervention developers to target participants more carefully. Interventions (face-to-face counselling as well as eHealth interventions) need to address participants' needs, which thus also involves a person's level of cognizance. A person that is non-cognizant may benefit from detailed feedback about their behaviour and the healthiness of the current state, while negative cognizant people may need a boost in knowledge and motivation, and people that are positive cognizant may need some help to ensure that they keep up the healthy behaviour over a long period of time. Health professionals therefore should use strategies to enhance cognizance with the use of instant tailored feedback of the behaviour and provision of detailed information about the healthiness of the current behaviour. Hereby health professionals could make use of new technologies such as mobile phone applications that track behaviour in real time and give direct advice/feedback that is tailored to the person's cognizance level. Additionally, as the level of cognizance is linked to knowledge about the health benefits of a certain behaviour, health professionals should focus on for example mass media campaigns that spread the information to a broad audience. This could over time help to not only inform people about health aspects but lead to a new norm within a society (Arias, 2016).

The third part of this thesis concentrated on the post-motivational processes of the I-change model. The results of chapter 5 and 6 show the importance of the enactment of plans within the I-Change mode. Plan enactment has been placed between planning and the target behaviour and shown to play an essential role in the transition from plans to behaviour. While the concept and its position in the model might seem logical, the explicit inclusion becomes clear in chapter 6, which shows that if a plan is made but not enacted the effect on behaviour could be counterproductive. As planning strategies are part of many interventions it is important to ensure that these plans are correctly enacted and

effective with regard to the outcome behaviour. Researchers and health professionals (e.g. general practitioners or guidance counsellor) should therefore focus on understanding what might hinder or facilitate the enactment of individuals' plans regarding different behaviours. A deeper understanding of what might be barriers for plan enactment can in turn lead to better construction of plans and better preparation of enactment. Intervention developers should focus on methods that can help the transition from planning to enactment using different strategies such as reminders, tailored feedback or repeated reinforcement. Health professionals could ensure that participants enact their set plans or give them the possibility to reflect on reasons that enactment failed and subsequently give the possibility to improve planning processes so that enactment becomes easier for the participants. This focus on the enactment of plans could help to close the intention-behaviour-gap and lead to longer lasting behavioural change. The effect on self-efficacy also indicates that people that enact their plans become more confident in their ability to behave healthy which would lead to a prolonged effect of interventions.

Main product of the thesis

The main product of this thesis is the tested and revised version of the I-Change model which includes two new concepts (i.e. cognizance and plan enactment) that help to further understand health behaviour and health behaviour change. As with any theoretical advancement the position and exact usefulness of both concepts needs further investigation and verification. However, the results of this dissertation show that there is potential in both concepts and that the inclusion in health interventions could benefit from the constantly growing use of mHealth. The use of new technologies can facilitate the structural incorporation of methods such as instant feedback or boosters within lifestyle interventions. This could lead to longer lasting change on a broad scale.